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10/813,757	03/31/2004	Philip Derbeko	SRAD 540	5259

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EXAMINER
PATEL, KAUSHIKKUMAR M

ART UNIT	PAPER NUMBER
2188	

NOTIFICATION DATE	DELIVERY MODE
06/13/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patent@myerswolin.com

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 March 2008</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>51-60</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>51-60</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 22, 2008 has been entered.

Response to Amendment

2.   This office action is in response to applicant's communication filed March 22, 2008 in response to PTO office action mailed October 22, 2007. The applicant's remarks and amendments to the claims were considered with the results that follow.

3.   In response to last office action, Claims 1-50 have been canceled. Claims 51-60 have been added. As a result, claims 51-60 remain pending in this application.

Response to Arguments

4.   Applicant's arguments with respect to claims 51-60 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6.   Claims 52-54 and 57-59 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification and as such considered to be a new matter.

As per claims 52 and 57, the limitations "only upon reception of a request for creating a snapshot volume of the production storage element:

determining if the snapshot volume already exists;

if the snapshot volume...if the snapshot volume exists:" (lines 2-11) are not described or supported by original disclosure, e.g. the steps of determining whether snapshot volume exists or not and subsequent actions taken based on determination are not described in the specification and thus considered as new matter. Applicant is advised to delete the new matter included in the amended claims or provide proper location in the original disclosure that describes the claimed steps of determining. During the prosecution in current office action the limitation "only upon reception of a request for creating snapshot volume" is treated as creating snapshot volume later in the time (e.g. mentioned as off-line in the specification).

Claims 53, 54, 58 and 59 are also rejected due their dependency on rejected claims.

7.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

8.   Claims 52-54 and 57-59 are rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

Claims 52 and 57 recite the limitations "a snapshot volume", "a production

storage element", "a snapshot volume", "a physical location", "a data chunk", "a physical

location" and "a location in the snapshot storage" in lines 2, 6, 7, 12, 17 and 18

respectively. These terms are open to interpretation and it is not clear whether they

refer to new element or element previously described in the claim or in the parent claim.

Appropriate corrections are required by providing proper antecedent basis such as "the

snapshot volume" or "the physical location".

Claims 52 and 57 recites the limitation specifying step of determining if snapshot

volume already exists and if snapshot volume does not exist, then copying a data chunk

residing in a production storage element to a location in a snapshot volume (lines 4-10

of claims 52 and 57). Here it is not clear that if snapshot volume does not exists than

how it is possible to copy a data chunk residing in a production storage element to a

location in the snapshot volume? Thus, the limitation renders the claims indefinite and

vague.

Claims 53, 54, 58 and 59 are also rejected due to their dependency on rejected

claims.

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

10.   Claims 51, 55, 56 and 60 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Lam et al. (US 2005/0172092 A1) and Yamagami (US 7,111,136).

        As per claim 51, Lam teaches a method for maintaining an updated copy (e.g.

writing all user requests into staging device, where new write request is an updated

copy of the data stored in the production element, par. [0035]) of a production storage

element (Lam, fig. 1, item 130), comprising:

        receiving a write small computer storage interface (SCSI) command (Lam, par.

[0031] teaches write command, pars. [0039] and [0040] teaches utilizing SCSI devices

and SCSI protocols, where it is readily apparent that if SCSI device and SCSI protocol

uses SCSI write commands), wherein the write SCSI command includes a new data

chunk and a destination address (Lam, par. [0031], "data write commands each

containing a data item intended for storage", "a data write command may also contain

metadata");

        saving the new data chunk and the destination address in a journal in an order

determined according to a time that the write SCSI command was received (Lam, par.

[0052], "storage manger inserts the data item into staging storage device along with the

associated metadata", par. [0037] "data items inserted into staging device may be

managed on a first-in-first-out basis, to ensure that changes made to a given data file

are recorded in the correct order");

saving the destination address in an entry in a changes table (as explained

above, Lam teaches storing user write requests and metadata into the staging device,

where it is readily apparent that the metadata includes the destination address and the

data structure (e.g. fig. 2) which stores metadata can be considered as changes table);

wherein the journal and the changes table represents the updated copy of the

production storage element (writing all user requests into staging device, where new

write request is an updated copy of the data stored in the production element, par.

[0035]) of a production storage element).

Lam explicitly fails to teach changes table including a pointer to a location of the

new data chunk in the journal and journal and changes table representing required

information for creating a snapshot volume. Yamagami teaches a journal entry of each

write operation issued by the host and creating snapshot volume by applying a series of

journal entries (Yamagami. col. 2, lines 55-63). The journal entry also includes header

with a pointer pointing to a location of data stored in the journal (Yamagami, fig. 2). It

would have been obvious to one having ordinary skill in the art at the time of the

invention to provide a snapshot volume as taught by Yamagami to recover data at any

point in time (Yamagami, col. 2, lines 3-14 and lines 61-63).

As per claim 55, Lam teaches wherein only single I/O operation is required to maintain the updated copy required for the creation of the snapshot volume (Lam teaches inserting user write requests into staging device and transmitting write complete acknowledgement to client (par. [0052]), where it is readily apparent that the updated copy is written in single I/O operation).

Claim 56 is similar in scope with claim 51; however Lam and Yamagami fail to teach a computer readable medium having stored thereon computer executable code for performing the method as recited in claim 51. However, performing method using computer executable code is well known in the art and the Examiner takes official notice of the fact. It would have been obvious to one having ordinary skill in the art at the time of the invention to provide computer readable medium having stored thereon computer executable code to perform method of claim 51 to optimize factors such as cost, speed and reliability.

Claim 60 is rejected under same rationales as applied to claim 55 above.

11.   Claims 52-54 and 57-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lam et al. (US 2005/0172092 A1) and Yamagami (US 7,111,136) as applied to claims 51 and 56 above and further in view of Applicant's Admitted Prior Art (incorporating Armangau (US 6,434,681 B1)) (AAPA herein after) and Cabrera et al. (US 6,708,227).

As per claim 52, Lam/Yamagami teaches all the limitation of claim 51 and further

teaches copying (back up) user data from staging (journal) device to primary and

secondary storage devices periodically and automatically (writing data later is treated as

creating a snapshot/backup of production storage, see 112 first paragraph rejection of

claims above) (pars. [0036], [0053], [0060]), but fails to teach limitations of claim 52.

AAPA teaches that backup and snapshot are two techniques for increasing data

reliability in storage systems and snapshot saves original copy of data before data being

modified and thus preserves the original data to different/same storage device such that

if the original data is corrupted then data is quickly restored to point-in-time just before

the data corruption has occurred. (AAPA, page 1, paragraph 3). Cabrera also teaches

that snapshot may be used like a backup copy of a volume, but it is much faster to

create than a full backup (Cabrera, col. 2, lines 48-55) and it is less resource intensive

backup process (Cabrera, col. 2, lines 12-16).

It would have been obvious to one having ordinary skill in the art at the time of

the invention to use snapshot technique as taught by AAPA and Cabrera in the system

of Lam/Yamagami because snapshot saves original data to different/same storage

device before being modified, thus providing point-in-time recovery of data (AAPA,

page, paragraph 3) and snapshots are much faster to create and less resource

intensive, thus improving backup capabilities of storage system (Cabrera, col. 1, line 67

– col. 2, line 57).

Lam, Yamagami, AAPA (incorporating Armangau (US 6,434,681 B1)) and

Cabrera fail to teach determining if the snapshot volume already exists; if the snapshot

volume does not exist: However it is noted that the combination of prior art references teaches creating snapshot volume as explained above and the goal of snapshot is to preserve the data as it exists on the storage device at a particular point in time. If the write request occurred without first preserving the data stored in the production storage, than the original data would be lost. Thus, it would have been obvious to one having ordinary skill in the art at the time of the invention to check if the snapshot volume exist before updating data in the production storage, if snapshot volume does not exists than copying original contents from production storage to a location in the snapshot volume before being updated by write command to preserve the original data from becoming corrupt or lost.

Thus, Lam, Yamagami, AAPA (incorporating Armangau (US 6,434,681 B1)) and Cabrera combine teach:

when the snapshot volume has not been modified since the last time that the snapshot volume was created, copying a data chunk residing in the production storage element at a physical location to a location in the snapshot storage volume; and copying the new data chunk from the journal to the physical location in the production storage element (AAPA, page 3, lines 1-9; or Armangau, col. 2, lines 11-34, it is noteworthy though, Armangau teaches host writing data to production storage and does not mention host writing data to journal device (or cache), he teaches cached storage system (Armangau, col. 8, lines 57-58) and data is cached, i.e. host accesses data to/from cache and then at some point in time data is flushed/written back to storage (primary) device and thus the meaning when host writes data to primary storage device

can be interpreted as host initially writes data to cache and then when data is flushed

(write-back), the original data chunk is read from production volume and written to

snapshot volume and new/modified/dirty data is written in place of original data

[Armangau, col. 10, lines 50-65, *"when port adapter receives a data storage access*

request from one the hosts", *"the port adapter accesses primary directory in the cache*

and determines whether or not the data resides in the cache". *"The storage device also*

performs a write-back operation to ensure that data is written to the cache memory

eventually becomes written to the disk array"]), wherein the location of the data chunk in

the journal is determined according to a respective entry in the changes table (here it is

noted that Yamagami teaches a header including data location, where it is readily

apparent that the data from journal is located from header pointing to a location in the

data journal, Yamagami, fig. 2).

Lam, Yamagami, AAPA and Cabrera explicitly fails to teach copying the new

data chunk from its location in the journal to a physical location in the production

storage element, when the snapshot volume has been modified since the last time that

the snapshot was created. However as mentioned above the goal of a snapshot is to

preserve the data and if the snapshot of the original data is taken previously (i.e. the

snapshot volume has been modified) then the original data is already preserved and

there is no harm to overwrite data in the production volume. Thus, it would have been

obvious to one having ordinary skill in the art at the time of the invention to write

(update) data from journal to a location in the production storage, if the snapshot

volume is modified since the last time snapshot was taken because since original data

is preserved in the snapshot volume, overwriting data will not corrupt the data stored in

the production storage.

As per claim 53, Lam teaches the physical address is determined according to

the destination address designated in the write SCSI command (Lam, pars. [0031],

[0043], [0052]).

As per claim 54, Lam teaches deleting the respective entry from the changes

table (Lam, par. [0056]).

Claims 57-59 are also rejected under same rationales as applied to claims 52-54

above.

Conclusion

12.   The examiner also requests, in response to this Office action, support be shown

for language added to any original claims on amendment and any new claims. That is,

indicate support for newly added claim language by specifically pointing to page(s) and

line no(s) in the specification and/or drawing figure(s). This will assist the examiner in

prosecuting the application.

13.   When responding to this office action, Applicant is advised to clearly point out the

patentable novelty which he or she thinks the claims present, in view of the state of the

art disclosed by the references cited or the objections made. He or she must also show

how the amendments avoid such references or objections See 37 CFR 1.111(c).

14.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Ohran (US 2003/0101321) teaches a method of maintaining a backup of the

storage system using snapshot and further teaches checking if the snapshot is exists or

not?

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to KAUSHIKKUMAR PATEL whose telephone number is

(571)272-5536. The examiner can normally be reached on 7.30 am - 4.00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Hyung Sough can be reached on 571-272-6799. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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Business Center (EBC) at 866-217-9197 (toll-free).

/Hyung S Sough/   KAUSHIKKUMAR PATEL
Supervisory Patent Examiner, Art Unit 2188   Examiner
06/08/08   Art Unit 2188

/kmp/